Earth's Biological History

8.2 **The student will demonstrate an understanding of Earth's biological diversity over time. (Life Science, Earth Science)**

8-2.1 Explain how biological adaptations of populations enhance their survival in a particular environment.

Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In 3rd grade (3-2.2), students explained how physical and behavioral adaptations allowed organisms to survive. The biotic composition of an ecosystem including populations is part of 5th grade ecosystems study (5-3.2). In 7th grade (7-4.1), students summarized the levels of organization within an ecosystem that included populations.

It is essential for students to know that populations in a particular environment that are better adapted to living conditions there, and therefore are able to meet their survival needs, are more likely to survive and reproduce offspring with those traits.

- There are *variations* among species of similar populations.
- Organisms of a species differ from one another in many of their traits.
- An *adaptation* is a trait or behavior that helps an organism survive and reproduce.
- *Natural selection* is the process that explains this survival and shows how species can change over time. For example, certain traits or adaptations involving color, camouflage, food gathering (beaks, claws) and other physical traits, sensory abilities, or behaviors enhance the survival of a species.

It is not essential for students to know the specifics involved in the theory of evolution, a gradual change in species over time. Natural selection over a long period of time can lead to helpful variations accumulating while unfavorable ones disappear. Studying Darwin's voyage and data is also not included in this indicator.

Assessment Guidelines:

The objective of this indicator is to *explain* how biological adaptations of populations enhance their survival in a particular environment; therefore, the primary focus of assessment should be to construct a cause-and-effect model of various adaptations resulting in population survival in particular environments. However, appropriate assessments should also require students to *compare* species of a particular population as to the adaptation that allows them to survive; *infer* from information about a particular environment the adaptation that a particular organism would need to survive there; or *identify* an adaptation that enhances survival of an organism based on pictures, diagrams, or word descriptions.